
SMS RTU

User Manual



Quality Technology Partners

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INTRODUCTION

The Product

What's in this Manual

This manual contains the following sections:



Throughout the manual *NOTE*s and *TIP*'s (shown in green italic letters) are included to give related suggestions, explanations and additional information, etc.

QTech Data Systems Limited is referred to as QTech throughout this manual.

Revision Notes

Version 1.00

FEATURES

The new SMS RTU has the following features implemented

Digital Input Alarms

- 1 alarm for each input (max 255)
- Real-time input state and alarm status display
- Up to 3 escalations for alarm
- Separate recipient, message and delays for alarm and escalations
- Return to normal messages for each alarm
- Acknowledge for individual alarms
- Configurable output change on acknowledge
- Current input state available by SMS query

Analog Input Alarms

- 2 alarm for each input (max 128)
- Real-time input level display either raw or scaled
- Real time alarm status display
- Scaling of alarm triggering values
- Current input level available in alarm SMS either raw or scaled
- 4 Triggering conditions for each alarm
- Up to 3 escalations for each alarm
- Separate recipient, message and delays for alarm and escalations
- Return to normal messages for alarms
- Acknowledge for individual alarms
- Configurable output change on alarm acknowledge
- Current input level available by SMS query either raw or scaled
- Periodic SMS of input value either raw or scaled

Digital Output Controls

- 1 Control for each output (max 255)
- Real-time output state display

- Current output state available by SMS query
- Set output state by SMS
- Authentication of set commands with caller ID
- Confirmation of set commands

Analog Output Controls

- 1 Control for each output (max 128)
- Real-time output level display either raw or scaled
- Current output level available by SMS query either raw or scaled
- Set output level by SMS either raw or scaled
- Authentication of set commands with caller ID
- Confirmation of set commands

Remote Diagnostics

- RTU calls Q90 for diagnostics on SMS command

GETTING STARTED

To configure the SMS RTU some settings have to be enabled with-in Q90.

Please follow these simple steps:

1. Startup Q90 with the RTU connected
2. After loading the settings from the RTU select the Communications tab
3. Within the RS232 section set the RS232 Device Type to Telephone Modem
4. Click the Configure button below this option
5. Select your modem type*
6. Check the Messaging box in the Function section
7. Click close

NOTE – *Only Wavecom and iPort modems are currently supported for SMS*

The SMS RTU now has its messaging services enabled. To enter the SMS display mode select SMS from the view menu.

SMS Status Display

This screen allows you to configure all SMS settings within the unit. If this is the first time that the display has been shown and an RTU is connected all the SMS settings will be loaded from the unit. It should look similar to that shown below. Each of the areas is discussed separately.

The screenshot shows the 'Q90' software interface with a menu bar (File, View, Configuration, Help) and a title bar 'SMS Overview'. On the left is a vertical sidebar with buttons: Digital Alarms (selected), Digital Controls, Analog Alarms, and Analog Controls. The main area is titled 'Digital Inputs' and contains a table with 8 rows of digital alarm settings. Each row has columns for Enable (checkbox), Name (text field), Value (text field), Status (text field), and a Config button. At the bottom are buttons for Edit Operators, Edit Messages, Load from RTU, Upload to RTU, and Exit. A status bar at the very bottom shows 'Local configure', 'Comms success' with a green checkmark, 'SMS Idle', and 'Version 2.8.0'.

	Enable	Name	Value	Status	
1	<input type="checkbox"/>	Digital Alarm #1	Open	Disabled	Config
2	<input type="checkbox"/>	Digital Alarm #2	Open	Disabled	Config
3	<input type="checkbox"/>	Digital Alarm #3	Open	Disabled	Config
4	<input type="checkbox"/>	Digital Alarm #4	Open	Disabled	Config
5	<input type="checkbox"/>	Digital Alarm #5	Open	Disabled	Config
6	<input type="checkbox"/>	Digital Alarm #6	Open	Disabled	Config
7	<input type="checkbox"/>	Digital Alarm #7	Closed	Disabled	Config
8	<input type="checkbox"/>	Digital Alarm #8	Open	Disabled	Config

Buttons: Edit Operators, Edit Messages, Load from RTU, Upload to RTU, Exit

Status Bar: Local configure | Comms success ☒ | SMS Idle | Version 2.8.0

Menu

The Menu bar allows different options to those shown in the diagnostics view. Each option is described below.

- File
 - Open Configuration – Loads an SMS settings file
 - Save Configuration – Saves an SMS settings file
 - Exit – Exit Q90
- View

- SMS – View SMS display
 - Diagnostics – View diagnostics display
- Configuration
 - Operators – Open operator setup dialog
 - Messages – Open message setup dialog
 - Modem – Open modem configuration dialog
- Help
 - Help – Launch help file
 - System Info – Launch system info application
 - About – Display QTech contact details

Status Bar

The status bar operates in the same fashion as on the diagnostics display other than the 6th panel shows the status of the modem. The following status may be shown:

- SMS Reset – SMS messaging is not configured
- SMS Idle – SMS operation normal
- SMS Send – Sending SMS message
- SMS Receive – Receiving SMS message
- SMS Disabled – Modem in use for call

Buttons

There are a number of buttons shown across the bottom of the SMS display. Not all of these may be visible or enabled at any one time. Each is described below.

- Edit Operators - Open operator setup dialog
- Edit Messages - Open message setup dialog
- Load from RTU – Load settings from RTU (Overwrite local settings)
- Upload to RTU - Load settings to RTU (Overwrite RTU settings)
- Load Status – Load current tab status (Only for use with remote connection)
- Exit – Exit Q90

Tab Control

The tab control consists of 4 tabs:

- Digital Alarms
- Digital Controls
- Analog Alarms
- Analog Controls

Each tab displays up to 8 input or outputs at any one time and may have a scroll bar if needed. Each input / output point will have a subset of the controls described below.

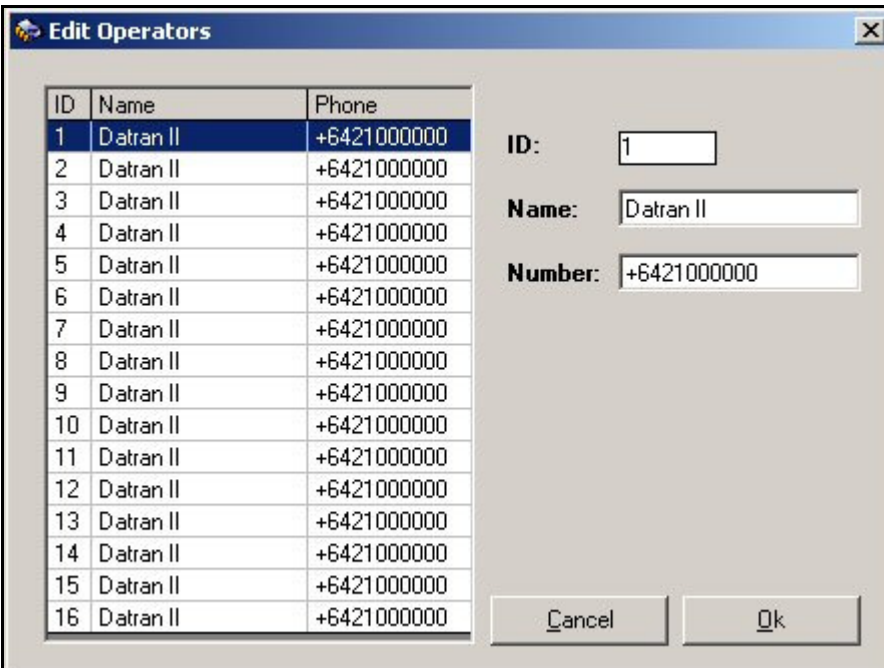
- ID – This is the ID of the input or output
- Enable – This shows if the alarm or control is enabled
- Name – This displays the name or label attached to the alarm or control
- Value – Displays digital state (Open/Closed) or analog value (Raw/Scaled)
- Units – Display analog units if scale being used
- Status – Displays alarm status
- Config – Opens control or alarm configuration panel

The status shown in each tab does not reflect the local settings but rather the state of the RTU. Settings must be uploaded before they will be reflected in the status. Each tab has a separate configuration panel where settings for each alarm or control can be modified.

CONFIGURATION

Operator Configuration

Operator names and numbers should be set up first as invalid operator numbers will prevent settings being saved to the RTU. The operator setup screen is similar to this.



Edit Operators

ID	Name	Phone
1	Datran II	+6421000000
2	Datran II	+6421000000
3	Datran II	+6421000000
4	Datran II	+6421000000
5	Datran II	+6421000000
6	Datran II	+6421000000
7	Datran II	+6421000000
8	Datran II	+6421000000
9	Datran II	+6421000000
10	Datran II	+6421000000
11	Datran II	+6421000000
12	Datran II	+6421000000
13	Datran II	+6421000000
14	Datran II	+6421000000
15	Datran II	+6421000000
16	Datran II	+6421000000

ID:

Name:

Number:

It is possible to setup 16 different operators within the system, each with a name and phone number. When the operators are set up they can be used within the other configuration screens without re-entering. When setup of operators is finished, OK should be pressed to save the data. Pressing cancel will cause data to be lost.

ID

This number is not configurable and shows the index number of the operator

Name

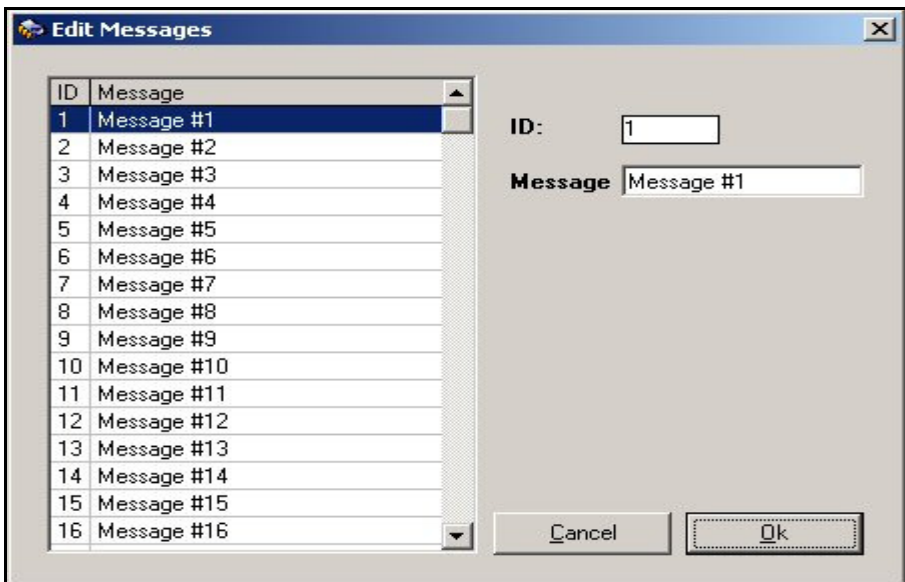
The name is used to identify each operator within the other configuration screens and therefore should be easy recognizable. Up to 20 characters are allowed.

Number

The phone number for the operator should be able to receive and send SMS messages. It can be entered using a number of formats, '+' signs are allowed or may be omitted. Country codes are also optional.

Message Configuration

Messages can be set up using this dialog.



Up to 48 messages can be set up in the system. These messages can then be configured to alarms and controls to be sent to operators under certain conditions. When setup of messages is finished, OK should be pressed to save the data. Pressing cancel will cause data to be lost.

ID

This number is not configurable and shows the index number of the operator

Message

The message can be up to 20 characters long

Digital Alarm Configuration

This panel is reach by selecting the config button beside one of the digital alarms. It should appear similar to that shown below.

The screenshot shows a 'Digital Alarm Configuration' dialog box. It has a title bar with a close button. The main area is divided into several sections. At the top, 'Digital Input 1' is on the left and 'Name' is on the right with a text field containing 'Digital Alarm #1'. Below this is a section for 'Alarm' with a checked checkbox. Under 'Condition', there are radio buttons for 'Open' and 'Closed', with 'Closed' selected. The 'Message' section has a dropdown menu showing '1: Message #1'. The 'Delay' section has a dropdown menu showing 'Immediate'. The 'Operator' section has a dropdown menu showing '1: Datran II'. Below this is an 'Escalations' section with a table of three rows. Each row has a checked checkbox, a 'Message' dropdown (all showing '1: Message #1'), a 'Delay' dropdown (all showing 'Immediate'), and an 'Operator' dropdown (all showing '1: Datran II'). At the bottom, there are two sections. The left one is 'Return to Normal Message' with a checked checkbox and a dropdown showing '1: Message #1'. The right one is 'Acknowledge' with a checked checkbox. Below it, 'On Ack change' has a dropdown showing 'Nothing' and 'To' has a dropdown showing 'On'. At the bottom right are 'Cancel' and 'Ok' buttons.

Digital Alarm Configuration			
Digital Input 1		Name: Digital Alarm #1	
<input checked="" type="checkbox"/> Alarm			
Condition: <input type="radio"/> Open <input checked="" type="radio"/> Closed			
Message: 1: Message #1		Delay: Immediate	Operator: 1: Datran II
Escalations			
<input checked="" type="checkbox"/>	Message: 1: Message #1	Delay: Immediate	Operator: 1: Datran II
<input checked="" type="checkbox"/>	Message: 1: Message #1	Delay: Immediate	Operator: 1: Datran II
<input checked="" type="checkbox"/>	Message: 1: Message #1	Delay: Immediate	Operator: 1: Datran II
<input checked="" type="checkbox"/> Return to Normal Message: 1: Message #1		<input checked="" type="checkbox"/> Acknowledge	
		On Ack change: Nothing To: On	
Cancel		Ok	

All the settings for the digital alarm are shown and can be modified. The digital input the alarm refers to is shown in the top left corner and the name given to it shown in the top right corner. Once a name is setup the state of the alarm can be queried. Each setting is described below.

Alarm

The alarm can be enabled by checking the box at the corner of the alarm section. This section presents a number of options.

- Condition – Sets the alarm trigger (Open or Closed)
- Message – Message to be contained in alarm SMS
- Delay – Trigger must be active for this period before alarm activates
- Operator – Recipient of alarm SMS

Return to Normal Message

This feature is enabled by checking the box at the corner of this section. There is only one setting here which is the message to be contained in the return to normal SMS. A return to normal message will be sent to all operators who received an alarm or escalation SMS about this input once the state returns to normal. (i.e. not trigger state)

Acknowledge

The acknowledge feature allows an operator to stop an alarm escalating. Once an acknowledgement is received the alarm stays at its current state. It is also possible to set a digital output when an acknowledgement is received using the settings in this section. Again this feature can be activated by selecting the box in the top left corner of this section.

- Change – Select digital output to set on acknowledgement
- To – Select new value of output

When setting up of a digital alarm is finished OK should be pressed to save the data. Pressing cancel will cause data to be lost.

Digital Control Configuration

This panel is reach by selecting the config button beside one of the controls on the Digital Controls tab. It should appear similar to that shown below.

Digital Control Configuration

Digital Output 1 **Name**

☒ **Enable Control**

☒ Send Confirmation

☒ **Authenticate Operator**

<input type="checkbox"/> Datran II	<input type="checkbox"/> Datran II
<input type="checkbox"/> Datran II	<input type="checkbox"/> Datran II
<input type="checkbox"/> Datran II	<input type="checkbox"/> Datran II
<input type="checkbox"/> Datran II	<input type="checkbox"/> Datran II
<input type="checkbox"/> Datran II	<input type="checkbox"/> Datran II
<input type="checkbox"/> Datran II	<input type="checkbox"/> Datran II
<input type="checkbox"/> Datran II	<input type="checkbox"/> Datran II
<input type="checkbox"/> Datran II	<input type="checkbox"/> Datran II
<input type="checkbox"/> Datran II	<input type="checkbox"/> Datran II

All the settings for the digital controls are shown and can be modified. The digital output the control refers to is shown in the top left corner and the name given to it shown in the top right corner. Once a name is setup the state of the control can be queried. Each setting is described below.

Enable Control

The control can be enabled by selecting the box in the top left corner of this section. This means that the unit will now accept SMS messages referring to this control. The format of these messages is shown later. The send confirmation setting within this section will force the unit to send a SMS back to the operator when a control is set showing the control state after processing of the message. This is on the proviso that the caller ID is presented to the unit.

Authenticate Operator

When this option is selected only certain users will be allowed access to controls. If an SMS is received from an operator not on the list it will not be processed.

When set-up of a digital control is finished OK should be pressed to save the data. Pressing cancel will cause data to be lost.

Analog Alarm Configuration

This panel is reached by selecting the config button beside one of the controls on the Analog Alarms tab. It should appear similar to that shown below.

Analog Alarm Configuration

Analog Input 1 Name: Analog Alarm #1

Input Value

☒ Append Value

☒ Scale Value Min: -32768 Max: 32767 Units: RAW

☒ **Alarm 1**

Condition: 0 < Less than 0

Message: 1: Message #1 Delay: Immediate Operator: 1: Datran II Escalations

Escalations

Message	Delay	Operator
<input type="checkbox"/> 1: Message #1	Immediate	1: Datran II
<input type="checkbox"/> 1: Message #1	Immediate	1: Datran II
<input type="checkbox"/> 1: Message #1	Immediate	1: Datran II

☒ **Return to Normal Message**: 1: Message #1

☐ **Acknowledge SMS Action**

On Ack change: Nothing To: On

☒ **Periodic**

Period: Hourly Minutes: 0 mins Operator: 1: Datran II

Cancel Ok

All the settings for the analog alarm are shown and can be modified. The analog input the alarm refers to is shown in the top left corner and the name given to it shown in the top right corner. Once a name is setup the level of the alarm can be queried. Each setting is described below.

Input

This section controls the scaling of analog levels.

- Append Value - Sets whether the analog level should be contained in alarm and return to normal SMS messages sent to the operator.
- Scale Value – This box shows whether analog levels from this input should be scaled.*
- Min / Max - Scale minimum and maximum values must be integers although scaled values are represented to 2 decimal places.
- Units – When a scaled value is displayed, either in the SMS status display or in a message, the units will also be shown.

***NOTE:** Raw values are in the range 0-65535; scaled values have a range of -32768 to 32767*

Alarm1 and Alarm 2

Each alarm operates independently on the same input. They can be enabled by selecting the box in the top right corner of the appropriate section. The following settings are valid for each alarm.

- Condition – This sets the trigger value(s). Triggering can occur when the input falls below a certain level, above a certain level, inside a range or outside a range.
- Message – Message to be contained in the alarm SMS
- Delay – Trigger must be active for this period before alarm activates
- Operator – Recipient of alarm SMS
- Escalations – This button shows the escalation settings

Escalations

There can be up to 3 escalations for each alarm. However they run in order so 1st and 2nd escalations must be set up before the 3rd. Alarm will not be escalated past the first un-enabled escalation. Each escalation has the following settings.

- Message – Message to be contained in escalation SMS
- Delay – Length of time since last SMS
- Operator – Recipient of escalation SMS

Return to Normal Message

This feature is enabled by checking the box at the corner of this section. There is only one setting here which is the message to be contained in the return to normal SMS. A return to normal message will be sent to all operators who received an alarm or escalation SMS concerning the current alarm once the level returns to normal. (i.e. not trigger state)

Acknowledge

The acknowledge feature allows an operator to stop an alarm escalating. Once an acknowledgement is received the alarm stays at its current state. It is also possible to set a digital output when an acknowledgement is received using the settings in this section. Again this feature can be activated by selecting the box in the top left corner of this section.

- Change – Select digital output to set on acknowledgement
- To – Select new value of output

Periodic

This section can be enabled in the usual manner, selecting the box at the top left of the section. It allows a SMS containing the input level to be sent periodically to a specified operator. There are a number of settings which may be viewed here depending on the length of period selected.

- Period – Select from one of the following and the options available
 - Hourly – Set the minutes past the hour these should be sent
 - Daily – Set the hour (0000-2300) at which the message should be sent
 - Weekly – Set the day (Sun - Sat) and hour (0000-2300) the message should be sent.
 - Monthly* – Set the date (1-31) and hour (0000-2300) the message should be sent.
- Operator – Recipient of periodic SMS

NOTE: *If a month does not contain the day number selected then the SMS will be sent at 0000hours on the first day of the next month. E.g. A message to be sent on the 31st of each month will be sent at 0000 on 1st March as there are not 31 days in February*

When setting up of an analog alarm is finished OK should be pressed to save the data. Pressing cancel will cause data to be lost.

Analog Control Configuration

This panel is reached by selecting the config button beside one of the analog controls. It should appear similar to that shown below.

Analog Control Configuration

Analog Output 1 **Name**

☒ **Output Scale**

Min **Max** **Units**

☒ **Control**

☒ **Send Confirmation**

☒ **Authenticate Operator**

<input type="checkbox"/> Datan II	<input type="checkbox"/> Datan II
<input type="checkbox"/> Datan II	<input type="checkbox"/> Datan II
<input type="checkbox"/> Datan II	<input type="checkbox"/> Datan II
<input type="checkbox"/> Datan II	<input type="checkbox"/> Datan II
<input type="checkbox"/> Datan II	<input type="checkbox"/> Datan II
<input type="checkbox"/> Datan II	<input type="checkbox"/> Datan II
<input type="checkbox"/> Datan II	<input type="checkbox"/> Datan II
<input type="checkbox"/> Datan II	<input type="checkbox"/> Datan II
<input type="checkbox"/> Datan II	<input type="checkbox"/> Datan II

All the settings for the analog controls are shown and can be modified. The analog output the control refers to is shown in the top left corner and the name given to it shown in the top right corner. Once a name is setup the level of the control can be queried. Each setting is described below.

Output Scale

This section refers to the scaling of the output level. Raw values are in the range 0-65535, scaled values have a range of -32768 to 32767. Scale minimum and maximum values must be integers although scaled values are represented to 2 decimal places. Units will also be added to messages containing scaled values.

Control

The control can be enabled by selecting the box in the top left corner of this section. When this is done the unit will accept SMS messages referring to this control. The format of these messages is shown later.

The send confirmation setting within this section will force the unit to send a SMS back to the operator when a control is set showing the control state after processing of the message. This is on the proviso that the caller ID is presented to the unit.

Authenticate Operator

When this option is selected only certain users will be allowed access to controls. If an SMS is received from an operator not on the list or the caller ID is not provided it will not be processed.

When set-up of an analog control is finished, OK should be pressed to save the data. Pressing cancel will cause data to be lost.

Remote Diagnostics

Remote diagnostics can be connected using the following steps.

1. Select Diagnostics from View menu
2. Select Environment Options from Configuration menu
3. Set remote coms to modem com port
4. Click OK
5. Select Remote Configuration from Configuration menu

At this point you have 2 options

- Send SMS to RTU to initiate connection
- Enter RTU phone number and click connect

A remote connection is now established between the RTU and Q90. Q90 operates as normal with the exception that SMS settings and status have to be explicitly requested from the SMS display panel.

If the connection was initiated at the RTU end then a SMS will be sent to the operator who initiated the session when the session is over, provided that the caller ID was presented to the RTU.

SMS Message Format

This section outlines the format of the SMS messages sent to and by the operator. It should be noted that messages are not case sensitive but no wildcards are permitted. An invalid message sent to the RTU will result in a error response SMS from the unit providing that the caller ID was presented to the unit. The following syntax is used for showing message structure:

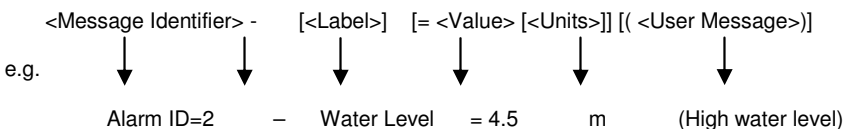
- <> Parameter
- [] Optional

RTU Originated Messages (Sent by the RTU to the Operator)

There are a number of messages which may be sent by the unit. These are listed below with an example for each type.

- Digital alarm (Sent when digital alarm triggered or escalated)
 - Alarm ID=1 – Pump Alarm #1 (Pump Malfunction)
- Analog alarm (Sent when analog alarm triggered or escalated)
 - Alarm ID=2 – Water Level =4.5 m (High water level)
- Return to normal (Sent when alarm trigger returns to normal)
 - RTN ID=1 – Pump Alarm #1 (Pump OK)
- Confirmation (Response to a set message)
 - Confirm – Pump Power=OPEN
- Query response (Response to a set message)
 - Query - Water Level =3.5 m
- Invalid Command
 - Invalid Command – (Pump Power =query)

The general message structure is shown here.



<Message Identifier>

The message identifier can be one of the following, one for each of the message types shown above. This is will always be present in the message.

- Alarm ID = <ID> - Alarm message with alarm ID
- RTN – Return to normal message
- Confirm – Set control confirmation message
- Query – Query response
- Invalid Command – Error response

[<Label>]

Generally this will show the name given the input / output, however there are some special cases as shown below.

- Diag – Remote diagnostics message

[= <Value> [<Units>]]

The value parameter shows the state or level of the input or output. It will be one of the following. Units will also be included if it is an analog value and scaled.

- Digital
 - Open
 - Closed
- Analog
 - 0-65535 – Un-scaled value
 - -32768-32767 – Scaled value to 2 decimal places

[(<User Message>)]

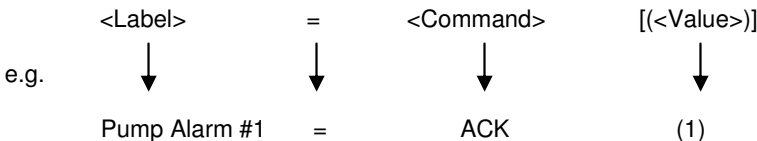
Any user message to be included in the SMS will be contained in brackets at this point.

Operator Originated Messages (Sent by the Operator to the RTU)

There are a number of messages that can be sent by the operator to the RTU. Each type is listed below with an example.

- Acknowledge – Acknowledge alarm
 - Pump Alarm #1=ACK(1) – Where the Alarm ID = 1
- Query – Query input / output
 - Water Level = QUERY
- Set Analog
 - Req. Water Level = VAL(3.6)
- Set Digital
 - Aux Pump=ON
- Remote Diagnostics
 - DIAG=PH(03333333) – Where Q90 phone number = 03333333
- Cancel alarms
 - ALL=CANCEL(YES) -
- Disable alarms
 - DIGITAL=DISABLE

The general message structure is shown here.



<Label>

The label normally refers to the output / input name but there are other values.

- <Name> – Input / Output Name
- DIAG – Identifier for remoter diagnostics
- ANALOG – All analog alarms*
- DIGITAL – All digital alarms*
- ALL – All alarms*

NOTE: Only valid for CANCEL and DISABLE commands

<Command> [(<Value>)]

The command and values are related and should be as follows

- Digital Set Commands
 - ON – Set digital output to closed
 - OFF – Set digital output to open
 - TOG – Toggle digital output
- Analog Set Command
 - VAL (<Value>) – Set analog value
 - Value - Un-scaled analog level (0-65535)
 - Value – Scaled value to 2 decimal places (-32768-32767)
- Acknowledge Command
 - ACK(<Value>) – Acknowledge alarm
 - Value – Alarm ID (1-255)
- Query Command
 - QUERY – Query input / output
- Remote Diagnostics Command
 - PH(<Value>) – Connect remote diagnostics
 - Value – Q90 phone number
- Group Acknowledge
 - CANCEL(<Value >) – Acknowledge all alarms
 - Value - Carry out Acknowledge operators? (Yes/No)
- Turn off all alarms
 - DISABLE – Disable all alarms*

NOTE: *Disabled alarms can only be re-enabled through Q90*